ARRA Section 1603 Grants in Lieu of Tax Credits for Renewable Energy: Overview, Analysis, and Policy Options

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Summary

Congress created the Section 1603 grant program as part of the American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5). This program, administered by the U.S. Department of the Treasury, provides cash grant incentives for renewable energy projects. Initially, the Section 1603 grant program was scheduled to expire at the end of 2010. A one-year extension was enacted as part of the Tax Relief, Unemployment Reauthorization, and Job Creation Act of 2010 (P.L. 111-312) at an estimated cost of $3 billion. Absent congressional action, the Section 1603 grant program will expire at the end of 2011.

As of December 6, 2010, grants totaling approximately $5.6 billion had been awarded to 1,495 entities, since Section 1603 became law in February 2009. Wind has received approximately 84% of the grant award value, while solar electric represents approximately 75% of entities that have received grant awards. “Other” technologies (qualifying energy property not represented by wind or solar electricity) have also received grant awards, although the value and number of awards represented by this category is relatively small compared to wind and solar electricity.

Prior to the availability of Section 1603 grants, qualifying renewable energy projects were federally supported primarily through the production tax credit (PTC) or investment tax credit (ITC). It has been common industry practice for renewable energy developers to partner with tax-equity investors, where the tax-equity investors offer cash in exchange for project ownership, project cash flows, tax credits, and depreciation benefits. The Section 1603 grant program was motivated by difficult economic conditions and the perceived lack of tax-equity capacity to support renewable energy projects. Analysis of the tax equity marketplace reveals fluctuations in the dollar volume, number of participants, and required rates of return between 2007 and 2010.

Market response, since Section 1603 was established, has been mixed. The solar industry had a record year of installations in 2010 (887 Megawatts) and is forecasting another record year in 2011 (approximately 1,700 Megawatts). In 2010, the wind industry experienced a 50% decline compared to 2009 (approximately 5 Gigawatts installed in 2010 compared to 10 Gigwatts installed in 2009). Wind industry forecasts for 2011 are approximately 7,000 Megawatts. It is important to note, however, that many factors influence annual renewable energy installations, the cash grant being just one.

If Congress considers additional extensions to or modifications of the Section 1603 grant program, economic and cost factors may also be taken into account. Grants, as opposed to tax credit, may be a more efficient mechanism for delivering public funds to the renewable energy sector. As is the case with most tax or subsidy programs, however, there are concerns that grants may be going to projects that would have moved forward without added federal incentives.

Finally, this report presents various policy options Congress may want to consider regarding the Section 1603 grant and related tax credits for renewable energy. The first option presented is to allow the grant program to expire. Even if the grant program were to expire, tax incentives would remain available. A second option is to extend the Section 1603 grant program. An extension of the grant program may be considered alongside an extension of the PTC for wind, which is set to expire at the end of 2012. A modification to the ITC and PTC, which could potentially enhance the benefits associated with the existing tax incentives, is presented as a third option.

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Introduction

Broad efforts are underway to expand the use of renewable energy technologies to increase domestic energy production, improve U.S. energy security, create new industries and new jobs, and reduce greenhouse gas emissions. According to the U.S. Energy Information Administration, renewable energy technologies provided 3.6% of U.S. electricity generation in 2009. Of the 144 million megawatt hours of electricity generated from renewable sources, wind provided 51.4%, wood and wood-derived fuels provided 24.8%, other forms of biomass provided 12.8%, geothermal accounted for 10.4%, and solar thermal/photovoltaic provided 0.6%.[1] Although U.S. renewable electricity markets have grown in size and scope in recent years, the cost of renewable electricity generation continues to be typically higher than conventional generation sources (e.g., coal, natural gas, existing nuclear). Federal tax policy has served to reduce this cost gap by providing various tax incentives for renewable energy.

Tax incentives, historically, have promoted investment in renewable electricity generation by rewarding either electricity production or investment in renewable generation capacity. In recent years, the size of tax benefits available for renewable energy investors has sometimes exceeded the investor's tax liability. Investors may carry unused tax credits forward to offset future tax liability, or, alternatively, partner with a third-party tax-equity investor capable of providing cash in exchange for tax benefits.

In February of 2009, Congress passed new legislation that provides renewable energy projects with an alternative option for realizing the value of federal tax benefits: a grant in lieu of tax credits (Section 1603 of the American Recovery and Reinvestment Act of 2009 (P.L. 111-5)). Commonly known as "Section 1603," this program affords the project the opportunity to receive a one-time cash grant instead of tax credits, thereby reducing the need for third-party tax-equity investors. One key motivation for creating the Section 1603 grant program was the perceived lack of tax equity capacity available for renewable electricity generation projects following the financial crisis in 2007. The Section 1603 grant program was initially enacted on a temporary basis, and was scheduled to expire at the end of 2010. Congress extended the program for one year, through 2011, in the Tax Relief, Unemployment Reauthorization, and Job Creation Act of 2010 (P.L. 111-312).

This report provides a comprehensive overview of the Section 1603 grant program. The first part of this report focuses on how different renewable energy market sectors have responded since the grant option was made available. Understanding how different renewable energy markets have responded to the grant option may provide some insight regarding the potential implications for the renewable energy market of letting the Section 1603 grant program expire as scheduled at the end of 2011.

The Section 1603 grant program was established in response to weak tax-equity markets. This report provides a detailed overview of tax-equity markets during the recent financial crisis, as well as information on the current status of tax-equity markets. Since weak tax-equity markets were a motivating factor in adopting the Section 1603 grant program in 2009, understanding trends in tax-equity markets may help Congress evaluate whether the policy motivations that led to the adoption of the Section 1603 grant program under ARRA remain relevant.

An economic perspective may also prove useful in evaluating a possible extension of the Section 1603 grant program. Oftentimes, subsidies that encourage the use of renewable energy resources

[1] Energy Information Administration, *State Historical Tables for 2009*, available at http://www.eia.doe.gov/ ... / generation_state.xls.

are not the most economically efficient means of achieving a policy objective. Compared to direct tax incentives, however, the Section 1603 grant program may be an improvement in terms of economic efficiency.

The final sections of this report provide various policy options related to the Section 1603 grant program. As noted above, absent congressional action, the Section 1603 grant program is scheduled to expire at the end of 2011. One option is to further extend the Section 1603 grant program. As another option, existing tax incentives could be modified to provide some of the added benefits associated with the Section 1603 grant program.

Background: Section 1603 Grants in Lieu of Tax Credits

Section 1603 of the American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5) provides grants for investments in certain energy production property in lieu of tax credits available under Sections 45 and 48 of the Internal Revenue Code (IRC). **Table 1** summarizes the available incentives by eligible technologies. Prior to ARRA, investments in renewable energy technologies were generally eligible for the production tax credit (PTC (IRC §45)) or investment tax credit (ITC (IRC §48)), depending on technology type. ARRA modified the incentives available for renewable energy investments in two ways: (1) PTC-eligible property was given the option to claim the ITC at the ITC rate, and (2) all eligible energy properties were allowed to elect to receive a one-time cash grant in lieu of tax credits.

The Section 1603 grant program provides payments equal to 10% or 30% of the eligible cost basis for specified energy projects. Under ARRA, projects placed in service during the 2009 or 2010 tax years, or those that met certain start-of-construction requirements before the end of 2010, were eligible for the grant option.[2] The Tax Relief, Unemployment Reauthorization, and Job Creation Act of 2010 (P.L. 111-312) extended the placed-in-service and construction start dates through the end of 2011. Qualifying projects placed in service, as well as those that meet start-of-construction requirements during 2011, and that are placed in service by the deadline noted in **Table 1**, may elect to receive a Section 1603 grant.

Table 1. PTC and ITC/1603 Incentives for Renewable Energy Property

Energy Property	Required In-Service Date	2010 PTC Rate ($/kWh)	ITC/1603: % of Eligible Cost Basis	Incentive options before ARRA	Incentive options after ARRA
Wind	1/1/2013	$0.022	30%	PTC	PTC, ITC, Grant
Closed-Loop Biomass	1/1/2014	$0.022	30%	PTC	PTC, ITC, Grant
Open-Loop Biomass	1/1/2014	$0.011	30%	PTC	PTC, ITC, Grant
Geothermal Energy[a]	1/1/2014	$0.022	30%	PTC	PTC, ITC, Grant
Landfill Gas	1/1/2014	$0.011	30%	PTC	PTC, ITC, Grant
Trash	1/1/2014	$0.011	30%	PTC	PTC, ITC, Grant

[2] Treasury guidance provides a detailed description of "beginning of construction" and projects can meet the deadline by demonstrating 1) physical work of a significant nature, 2) construction by contract, or 3) safe harbor (more than 5% of the total cost of the property either paid for or incurred).

Energy Property	Required In-Service Date	2010 PTC Rate ($/kWh)	ITC/1603: % of Eligible Cost Basis	Incentive options before ARRA	Incentive options after ARRA
Qualified Hydropower	1/1/2014	$0.011	30%	PTC	PTC, ITC, Grant
Marine & Hydrokinetic	1/1/2014	$0.011	30%	PTC	PTC, ITC, Grant
Small Wind[b]	1/1/2017	n.a.	30%	ITC[b]	ITC, Grant
Solar	1/1/2017	n.a.	30%	ITC	ITC, Grant
Geothermal Heat Pumps	1/1/2017	n.a.	10%	ITC	ITC, Grant
Fuel Cells[c]	1/1/2017	n.a.	30%	ITC	ITC, Grant
Microturbines[d]	1/1/2017	n.a.	10%	ITC	ITC, Grant
Combined Heat & Power (CHP)	1/1/2017	None	10%	ITC	ITC, Grant

Source: IRC §§45 and 48; U.S. Department of the Treasury 1603 guidance; IRS Notice 2010-37.

a. Geothermal energy property qualifies for a 10% ITC under IRC §48. As PTC-eligible property, geothermal energy investments are eligible for a 30% grant under Section 1603 of ARRA.

b. Small wind turbines are those with a up to 100 kW in capacity. Prior to ARRA, small wind was subject to a $4,000 credit limit.

c. Maximum payment for fuel cell property may not exceed $1500 for each 0.5 kilowatt of capacity.

d. Maximum payment for microturbine property may not exceed $200 for each kilowatt of capacity.

Renewable Energy Tax Incentives: Pre-2009

As was noted above, before 2009, the ITC and PTC were the predominant tax incentives for renewable energy.[3] The technology receiving the most federal subsidization under the ITC is solar (PV, solar thermal, etc.) electricity, where qualified investments are eligible for a 30% tax credit. **Table 1** summarizes the ITC rates available for other technologies as well as the ITC placed-in-service deadlines.[4] The PTC provides a per kilowatt-hour tax credit for renewable energy produced at qualified facilities.[5] Generally, the PTC is available for 10 years following an eligible facility's being placed-in-service. **Table 1** summarizes the current PTC rates for various eligible technologies as well as the placed-in-service deadlines.

The PTC has been the primary incentive for wind since its adoption in 1992.[6] Since 1992, the PTC has been allowed to lapse a number of times.[7] Historically, these lapses have been followed by a short-term extension of the incentive, allowing the program to again lapse in a few years.

[3] IRC §48 and IRC §45.

[4] The ITC was introduced as part of the Energy Policy Act of 1978 (P.L. 95-618). A full legislative history of the ITC can be found in U.S. Congress, Senate Committee on the Budget, *Tax Expenditures: Compendium of Background Material on Individual Provisions*, committee print, prepared by Congressional Research Service, 111th Cong., 2nd sess., December 2010, S. Prt. 111-58, pp. 185-190.

[5] The tax credit amount is 1.5-cents per kWh in 1993 dollars, indexed annually for inflation.

[6] The PTC was adopted as part of the Energy Policy Act of 1992 (P.L. 102-486).

[7] For a complete legislative history of the PTC, see U.S. Congress, Senate Committee on the Budget, *Tax Expenditures: Compendium of Background Material on Individual Provisions*, committee print, prepared by Congressional Research Service, 111th Cong., 2nd sess., December 2010, S. Prt. 111-58, pp. 297-204.

Annual installations in wind capacity are much lower in years where the PTC has been allowed to lapse, suggesting that the credit plays an important role in wind deployment.[8]

Investments in renewable energy also benefit from favorable depreciation schedules. Under the Modified Accelerated Cost Recovery System (MACRS), a number of renewable energy technologies are classified as five-year property, including solar and wind.[9] Generally, taxpayers are required to capitalize investments in capital assets, and deduct through depreciation allowances the cost of the investment over the useful life of the property. Shorter depreciation schedules, which allow investments to be depreciated quickly, are favored by investors as they allow costs to be recovered more quickly.[10]

Bonus depreciation has also been used to encourage investment in renewables.[11] The Emergency Economic Stabilization Act of 2008 (EESA; P.L. 110-343) provided a 50% first-year bonus depreciation for eligible renewable energy investments.[12] This provision was extended through 2009 under ARRA. Bonus depreciation for renewables expired at the beginning of 2010, before being retroactively extended through the end of the year under the Small Business Jobs Act of 2010 (P.L. 111-240). The Tax Relief, Unemployment Reauthorization, and Job Creation Act of 2010 (P.L. 111-312) further expanded and extended bonus depreciation provisions. Under P.L. 111-312, qualifying renewable energy property placed in service between September 8, 2010, and January 1, 2012, qualifies for 100% bonus depreciation (i.e., the property may be expensed). Qualified property placed in service in 2012 qualifies for 50% bonus depreciation.

Creation of Section 1603 was motivated by challenging economic conditions and reduced availability of tax equity, which is the primary vehicle for renewable energy projects to monetize tax incentives.[13] Section 1603 grants allow renewable energy project developers to immediately recover up to 30% of eligible project capital cost expenditures. This serves to, in some cases, reduce the financial risk[14] for projects and provide an alternative tax credit monetization pathway.

Renewable Energy Market Response to Section 1603

Participation in the Section 1603 grant program includes several renewable energy technologies. As of October 24, 2011, grant awards had been made to 3,801 recipients with a total grant award value of $9.2 billion. Recipients that installed solar electricity projects have received the largest

[8] For analysis of the effects of the PTC over time, see Ryan Wiser, Mark Bolinger, and Galen Barbose, "Using the Federal Production Tax Credit to Build a Durable Market for Wind Power in the United States," *The Electricity Journal*, vol. 20, no. 9 (November 2007), pp. 77-88.

[9] IRC §168(e)(3)(B)(vi)(I). Biomass systems are generally classified as seven-year property.

[10] This assumes that taxpayers are able to realize deductions in the year they are eligible to claim them or find some other way to monetize tax benefits. Some renewable projects may not be able to realize the full benefits associated with accelerated or other favorable depreciation schemes if such projects have little taxable income to offset in the early years of operation.

[11] For a general overview of investment subsidies, including investment credits and accelerated depreciation deductions, see CRS Report R41034, *Business Investment and Employment Tax Incentives to Stimulate the Economy*, by Thomas L. Hungerford and Jane G. Gravelle.

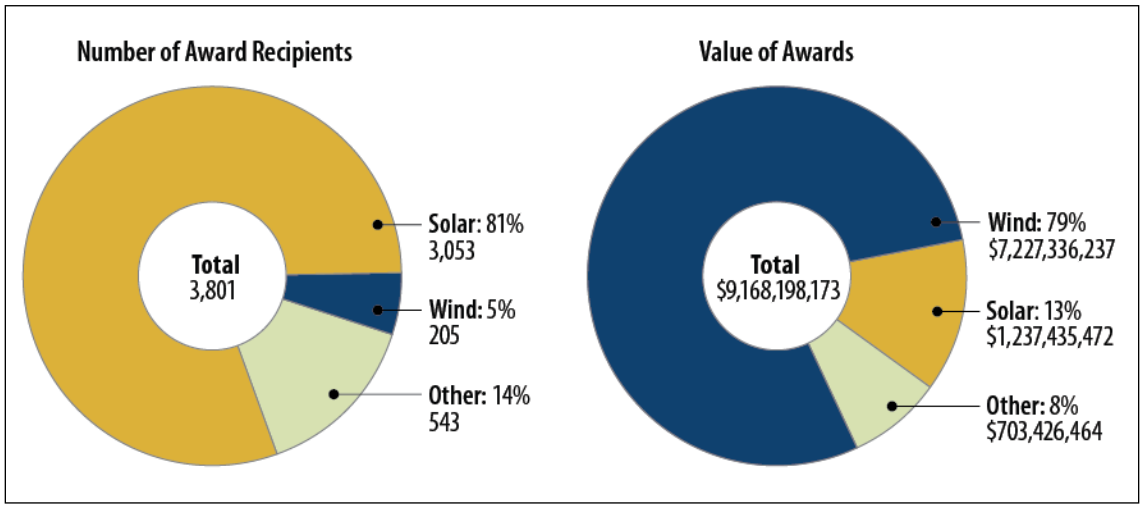
[12] Eligible investments include any property with a cost recovery period of 20 years or less.

[13] Mark Bolinger, Ryan Wiser, and Naim Darghouth, "Preliminary evaluation of the Section 1603 treasury grant program for renewable power projects in the United States," *Energy Policy*, vol. 38, no. 11 (November 2010), pp. 6804-6819.

[14] Financial risks include (1) tax capacity needed to realize the value of tax credit incentives; (2) in the case of production tax credits, the performance of the technology being used; (3) ability of projects to find a suitable tax equity investor; among others.

number of grant awards, while wind projects have captured most of the grant dollars (see **Figure 1**).[15] "Other" projects awarded grants include all other ITC- and PTC-eligible property.

Figure 1. Section 1603 Cash Grants Awarded To Date



Source: U.S. Department of the Treasury.

Notes: Numbers in this chart are based on Treasury data as of 10/24/11. Treasury also periodically publishes a status update of the Section 1603 grant program (see http://www.treasury.gov/initiatives/recovery/Documents/2011-09-11%20-%20S1603%20Overview%20-%20No%20Maps.pdf). As of September 11, 2011, approximately 19,875 projects have received grants under the Section 1603 program. The large discrepancy with project award numbers is a result of some recipients receiving awards for multiple projects.

Market response and impact, along with motivations to apply for a Section 1603 cash grant, differ among the technology types. The following analysis evaluates these parameters for the wind, solar, and other technologies that have elected a cash grant in lieu of tax credits.

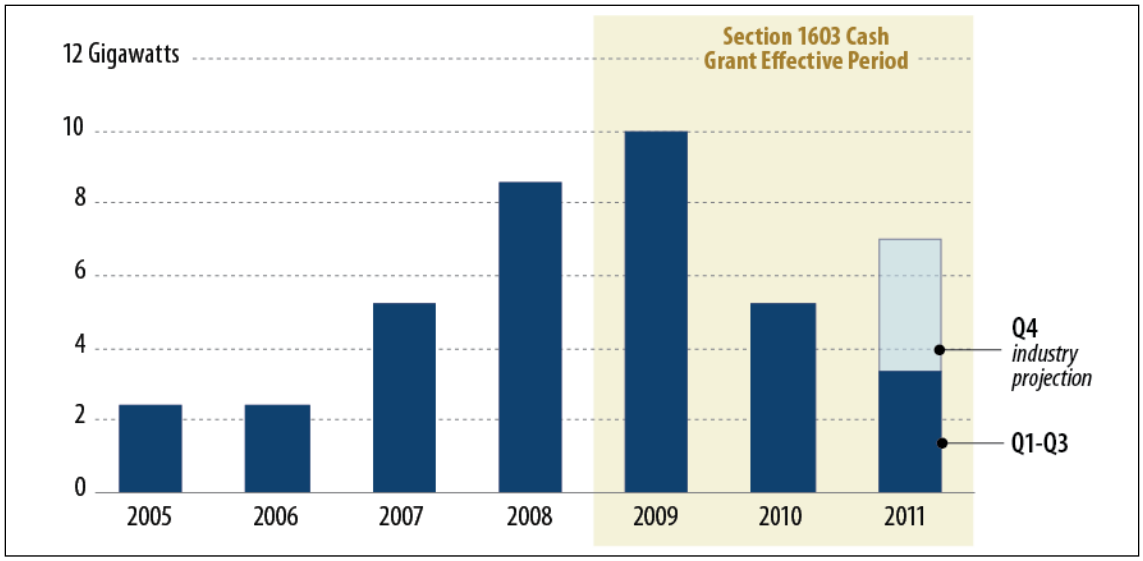
Wind

Wind projects have received, by far, the most value (in terms of dollars) from the Section 1603 grant program. Approximately $7.2 billion in grants have been awarded to 205 recipients. In 2009, the first year the cash grant was in effect, a record 10 Gigawatts (GW) of wind capacity was installed in the United States (see **Figure 2**). However, it is questionable what portion of 2009 installations were enabled by the 1603 cash grant. Since large wind projects can take 9 to 12 months or more to complete, many projects that became operational in the first three quarters of 2009 would have likely been completed without the Section 1603 cash grant. Despite these difficulties, researchers have attempted to quantify the impact of the Section 1603 grant program on the industry. According to one estimate, as much as 2.4 GW of 2009 wind installations were directly enabled by the Section 1603 cash grant program.[16] Wind capacity additions in 2010 were approximately 5 GW, roughly half the 2009 level.

[15] U.S. Treasury Department, see http://www.treasury.gov/initiatives/recovery/Documents/2011-09-11%20-%20S1603%20Overview%20-%20No%20Maps.pdf.

[16] Mark Bolinger, Ryan Wiser, and Naim Darghouth, "Preliminary Evaluation of the Section 1603 Treasury Grant Program for Renewable Power Projects in the United States," *Energy Policy*, vol. 38, no. 11 (November 2010), pp. 6804-6819.

Figure 2. U.S. Wind Installations Since 2005



Source: American Wind Energy Association (AWEA) annual and quarterly reports.

Notes: Section 1603 became law in February 2009. Program guidance from the Department of the Treasury was released in July 2009.

Wind installations in the first three quarters of 2011 totaled 3.7 GW, nearly double the amount during the same period in 2010.[17] Furthermore, many industry projections estimate that CY2011 large wind installations will be approximately 7 GW, a roughly 38% increase from 2010 levels. Given the volatility experienced in the wind industry since cash grant incentives were made available, critics of the Section 1603 cash grant may argue that the program had marginal positive impacts on the wind industry. Interpreting such industry statistics should be done cautiously, however, since the Section 1603 cash grant is only one of several factors that influence annual wind capacity additions. Other factors may include:

- **General economic conditions (electricity demand):** Electricity demand is directly correlated to economic conditions, and new generation requirements decrease during periods of economic slow down. AWEA attributes the 2010 wind installation downturn, in part, to "sluggishness in the economy."[18] According to EIA data, in the first eight months of 2010 U.S. electricity demand had rebounded to 2008 levels following a drop of approximately 4.7% in 2009.[19] An assessment of the potential lag effect of energy demand reductions, and therefore renewable energy procurement, is beyond the scope of this report.
- **Transmission access and availability:** Access to transmission capacity is a critical parameter for wholesale energy projects, as it provides a mechanism for matching the producer with consumers. Many high-quality wind sites in the upper midwestern United States are limited by the availability of transmission infrastructure to deliver wind-derived energy to demand centers.

[17] American Wind Energy Association (AWEA) annual and quarterly reports.

[18] American Wind Energy Association, "Third Quarter 2010 Market report," October 2010, at http://www.awea.org/documents/reports/2010_third_quarter_report.pdf.

[19] Energy Information Administration, "Monthly Energy Review," December 2010, at http://www.eia.gov/mer/pdf/pages/sec7_3.pdf.

- **Natural gas prices:** Purchasers of wholesale power commonly use the cost of natural gas electricity generation as a benchmark for procuring renewable electricity. For example, the California Public Utilities Commission (CPUC) has used a "Market Price Referent," or MPR, as a benchmark for assessing above-market costs of renewable electricity generation, and the MPR "can serve to contain the total cost" of renewable energy procurement programs. California's MPR is based on a 500MW Combined Cycle Gas Turbine electric generating facility and includes natural gas price projections.[20] With natural gas prices at relatively low levels, the proxy for renewable energy procurement is low as well, and this condition makes it difficult for project developers to establish Power Purchase Agreements (PPAs) with utility customers that result in an economically viable project. Renewable energy projects in Virginia, Kentucky, and other states reportedly have been rejected due to lower fossil energy generation costs.[21]
- **Policy clarity:** The American Recovery and Reinvestment Act (ARRA) became law in February 2009 and Treasury guidance for the program was released in July of 2009. Industry participants might argue that financing decisions and commitments were at a near standstill during this period since the financial community was not able to clearly understand the impacts of the Section 1603 cash grant program until details of the program were available. This time lag between policy announcement and policy definition could be a possible contributor to the decline of wind installations in 2010.

A complete analysis of the Section 1603 grant program requires evaluating the value of pre-2009 tax incentives relative to the benefits of receiving a Section 1603 grant. As discussed above, prior to 2009, the primary tax incentives for investments in wind energy were the PTC and accelerated depreciation.[22] With a PTC, projects with higher capacity factors (percent of generating time per year) would receive the most value from PTC incentives. Furthermore, accelerated depreciation allows a project to maximize depreciation losses in the first five years of operation, and this serves to reduce taxable income, and therefore improve project cash flow, during this five-year time period.

Wind and other renewable energy projects, especially in the early years of operation, often do not have taxable income sufficient to maximize the value of the PTC and accelerated depreciation deductions. Therefore some wind projects, prior to Section 1603 availability, would essentially monetize the PTC and depreciation tax benefits, at a discount, through a tax equity investor (a definition and description of tax equity is provided in this report under the section heading "Section 1603 and the Renewable Energy Tax Equity Market ") and use the cash proceeds to cover capital and installation costs.

With the availability of Section 1603 cash grants, wind projects can now choose between the PTC, ITC, or cash grant. PTC values are based on the total amount of electrical generation (kilowatt hours) and cash grant values are based on the total amount of eligible installed costs. In

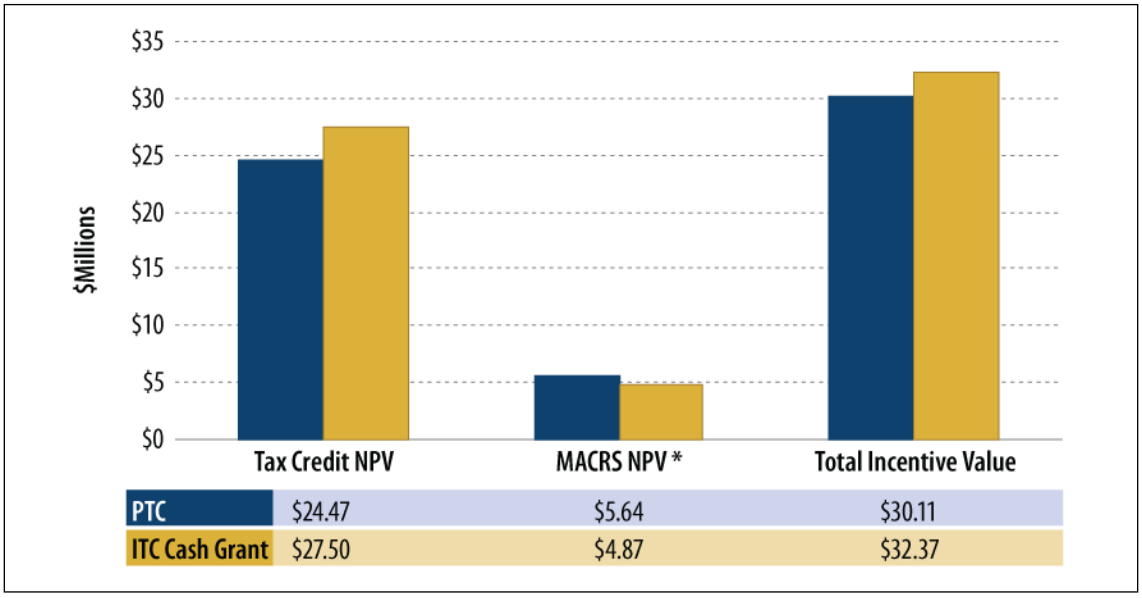
[20] California Public Utilities Commission, "Market Price Referent," December 1, 2010, at http://www.cpuc.ca.gov/PUC/energy/Renewables/mpr.

[21] Matthew L. Wald and Tom Zeller Jr., "Cost of Green Power Makes Projects Tougher Sell," *New York Times*, November 7, 2010.

[22] In recent years, bonus depreciation has also been available for investments in wind. The analysis presented below, however, incorporates only the PTC and accelerated deprecation.

order to assess the relative value, to a wind project, of both financial incentives, a present value model was created to provide comparative estimates for each incentive type. This model provides an illustration of the potential benefits associated with a Section 1603 grant for a hypothetical project. For a specific project, a cash flow model would be the ideal method for estimating these incentive values.[23] However, since all projects have unique financial parameters, this present value methodology was used to provide reasonable and relative numbers for a comparative assessment. Absolute numbers for incentive values will vary based on specific project assumptions. The following table illustrates a hypothetical 50MW wind project, finance assumptions, and calculated values for PTC, ITC, and accelerated depreciation (i.e., MACRS) incentives.

Figure 3. Example Wind Project: PTC and ITC Cash Grant Incentive Values



Source: CRS analysis.

Notes: Project Assumptions: 50MW nameplate capacity; $2/watt installed cost; 35% capacity factor; PTC/kWhr = $0.022 Inflation = 2%; Tax equity required return = 8%; Federal tax rate = 35%; State tax rate = 8%; Effective cash grant rate = 27.5% (this is lower than 30% because not all incurred costs are eligible for the cash grant). NPV = Net Present Value. * MACRS NPV values differ because the depreciation base is reduced by an amount equal to 50% of the ITC cash grant, if the cash grant option is selected; five-year MACRS schedule used to calculate accelerated depreciation value; MACRS value represents the "incremental" value of accelerated depreciation (i.e., the difference between MACRS and 10-year straight-line depreciation).

Based on the analysis above, the total value of federal tax incentives (PTC/ITC plus accelerated depreciation), after being discounted based on an assumed tax equity investor required return, is equal to 29% to 32% of the project's total capital cost under both incentive structures. Literature sources cite examples of projects being subsidized by as much as 65% of total project capital costs, although details supporting these estimates are not provided in the references.[24] It is

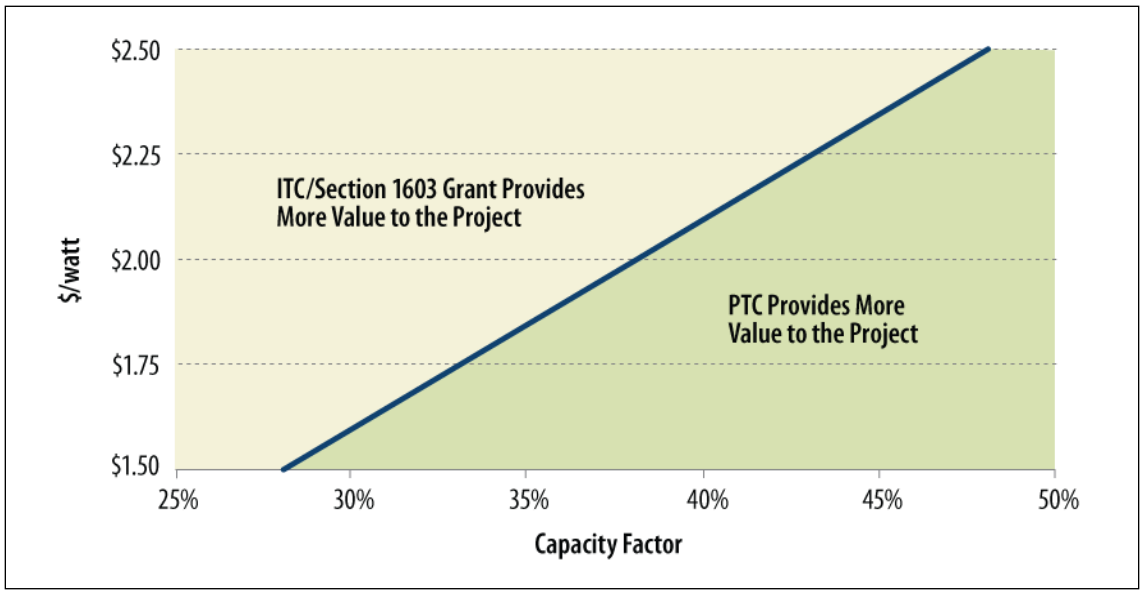
[23] For more detail regarding the CRS model used for this analysis, contact Phillip Brown.

[24] Chadbourne & Parke's April 2010 Project Finance NewsWire states that up to 65% of renewable energy costs are subsidized by the federal government. This statement appears to be based on taking the full value of depreciation benefits provided to renewable projects. CRS analysis, provided in the above figure, estimates the "incremental" value of accelerated deprecation, i.e., MACRS ("incremental value is calculated by subtracting the present value of straight line depreciation from the present value of MACRS depreciation), when compared to straight-line, since MACRS is acceptable for certain energy properties.

important to understand that the above example is for a specific wind project with pre-defined parameters, is provided as a representative example of calculating federal incentive values, and results will vary based on unique project attributes (i.e., the value of the PTC incentive totally dependent on the project capacity factor).

Project capacity factor and installed cost are two primary considerations when evaluating the PTC versus the ITC/Section 1603 cash grant options. Generally, higher capacity factors tend to result in the PTC being the most valuable option, since PTC incentives are based on the amount of annual kilowatt hours produced. However, project capital costs can change the value assessment outcome, since higher capital costs will result in the ITC/Section 1603 cash grant providing more value. The following figure provides a sensitivity analysis for wind projects based on project capacity factor (%) and installed cost ($/watt) metrics.

Figure 4. Incentive Value Sensitivity Analysis



Source: CRS analysis.

Notes: Project assumptions used for this analysis are the same as those noted in Figure 3; PTC and ITC values used to create this figure include the value of MACRS accelerated depreciation; Lawrence Berkeley National Labs (LBNL) performed a similar type of analysis (see Mark Bolinger, Ryan Wiser, and Naim Darghouth, "Preliminary Evaluation of the Impact of the Section 1603 Treasury Grant Program on Renewable Energy Deployment in 2009", Ernest Orlando Lawrence Berkeley National Laboratory, April 2010, page 19.). These results may vary from other estimates as a result of different assumptions used for the calculations.

With the availability of Section 1603 cash grants, wind project developers now have a choice when selecting available federal incentives to support project finance requirements. Depending on the capacity factor and installed cost for a particular project, project developers can quickly determine which incentive structure offers the most value based on these two project parameters.[25] Depending on the capital cost and capacity factor for a specific project, the developer will likely choose the incentive approach that yields the most value. However, the

[25] Once again, other project parameters (e.g., the required return for tax equity) can potentially alter the incentive type decision. This analysis assumes that all project parameters, except capacity factor and installed cost, are static.

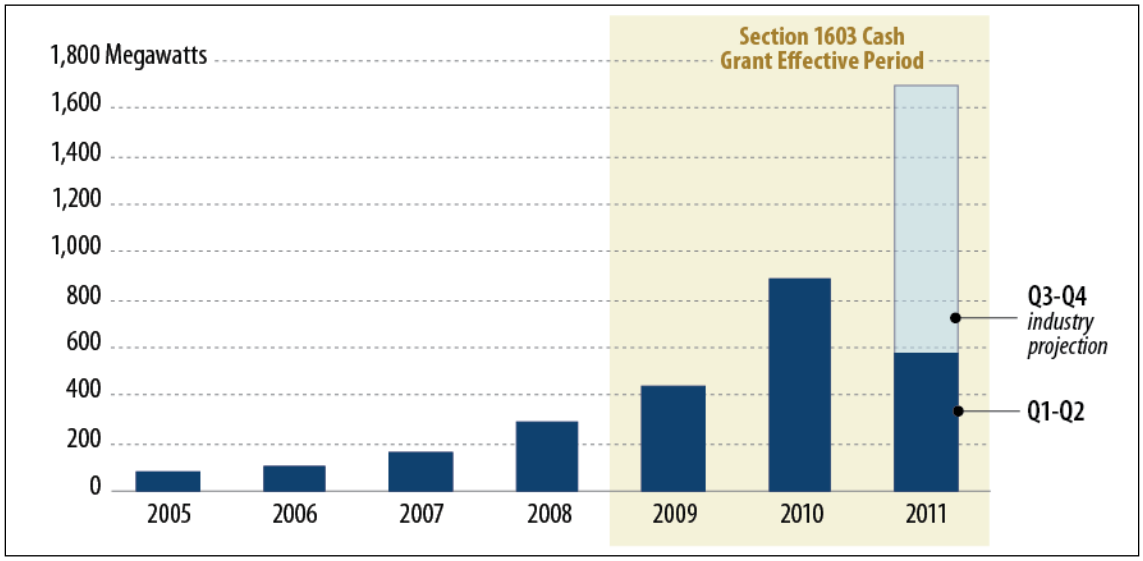
choice of incentives is predicated on the availability of tax equity investors to monetize the PTC tax benefits for wind projects.

One possible effect of the ITC/1603 cash grant option is the development of "marginal" (i.e., low capacity factor) project sites that would not be economically feasible under a PTC incentive structure.[26]

Solar Electricity

The solar electricity marketplace (photovoltaic, solar thermal, etc.) has experienced consistent upward trajectory since 2005 (see **Figure 5**) and 2010 was a record year for the industry, with new installed capacity of 887 Megawatts (MW).[27] Calendar year 2011 is expected to be another record year for the industry with forecasts predicting approximately 1,700 MW of new installations.[28] It should be noted, however, that the solar electricity market is currently much smaller than the wind market. While year-on-year growth for solar has been substantial, projected 2011 solar capacity installations, in terms of megawatts, are approximately 24% of 2011 wind installations.

Figure 5. U.S. Solar Installations Since 2005



Source: Solar Energy Industries Association

Notes: Solar installations include all solar market segments: Residential, Non-residential, Utility, and Concentrating Solar Power (CSP).

Solar electricity projects have received the largest number of Section 1603 cash grant awards. The Department of the Treasury has awarded grants to 3,053 recipients that represent more than

[26] LBNL evaluated a subset of 40 Wind projects that received 1603 cash grants and categorized each project based on the "face value" of the PTC and Cash grant. See "Preliminary Evaluation of the Impact of the Section 1603 Treasury Grant Program on Renewable Energy Deployment in 2009."

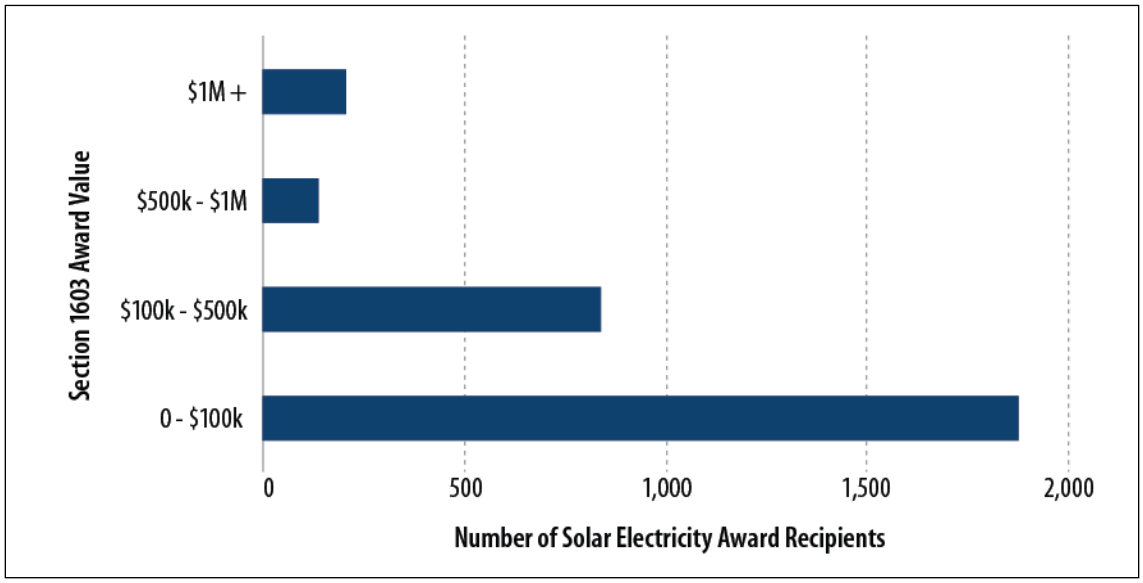
[27] Solar Energy Industries Association.

[28] Ibid.

19,000 individual solar projects.[29] The majority of these projects consist of small installations as evidenced by the distribution of grant award values (see **Figure 6**).

Compared to the wind marketplace, solar electricity projects are impacted by the Section 1603 cash grant program in different ways. Unlike wind, solar electricity projects do not have a production tax credit (PTC) option to consider when evaluating federal incentive options (solar electricity projects are, however, eligible for MACRS accelerated depreciation). Instead, solar electricity projects can choose either (1) a 30% investment tax credit (ITC), or (2) a Section 1603 cash grant in lieu of the ITC equal to 30% of eligible project capital costs. Option 1 (30% ITC) can sometimes be challenging for solar electricity projects to use, because it requires each project to self-shelter the ITC, using 100% of the tax credit to offset tax liability. Investment tax credits have the most value if they are used to offset income in the current year. If a taxpayer cannot claim the full value of tax credits in the current years, taxpayers are able to carry forward unused tax credits for up to 20 years.[30] The ITC also has a one year carryback period.[31] For many business entities, especially small businesses with limited revenue and income, having a taxable income base large enough to take full advantage of the tax credit and accelerated depreciation benefits can be difficult. Based on the number of small grant awards issued to date, Section 1603 cash grants appear to have reduced this difficulty by encouraging thousands of small solar electricity project installations.

Figure 6. Solar Electricity Section 1603 Grant Award Values



Source: U.S. Department of the Treasury

Prior to the availability of Section 1603 cash grants, solar electricity projects that did not have an adequate tax liability to effectively use available tax credits could make arrangements for ITC and MACRS accelerated depreciation monetization with a tax equity investor. Solar electricity projects could, in effect, monetize their ITC and depreciation incentives through a tax equity

[29] Email correspondence with Treasury officials revealed that some business entities have received awards for multiple projects and 1603 solar awards include approximately 3,700 individual projects.

[30] IRC §39.

[31] When tax credits are carried forward, previously unused credits are used to offset future tax liability. When tax credits are carried back, taxpayers may request a refund for taxes previously paid, as current tax credits are being used to offset past tax liability.

investor (a definition and description of tax equity is provided in this report under the section heading "Section 1603 and the Renewable Energy Tax Equity Market ") at a discount and receive cash proceeds towards project capital and installation costs. The ability of individual small solar projects to monetize tax incentives is questionable, though, as the amount of due diligence required for a tax equity investor to structure a transaction may negate the tax benefits offered by small projects.

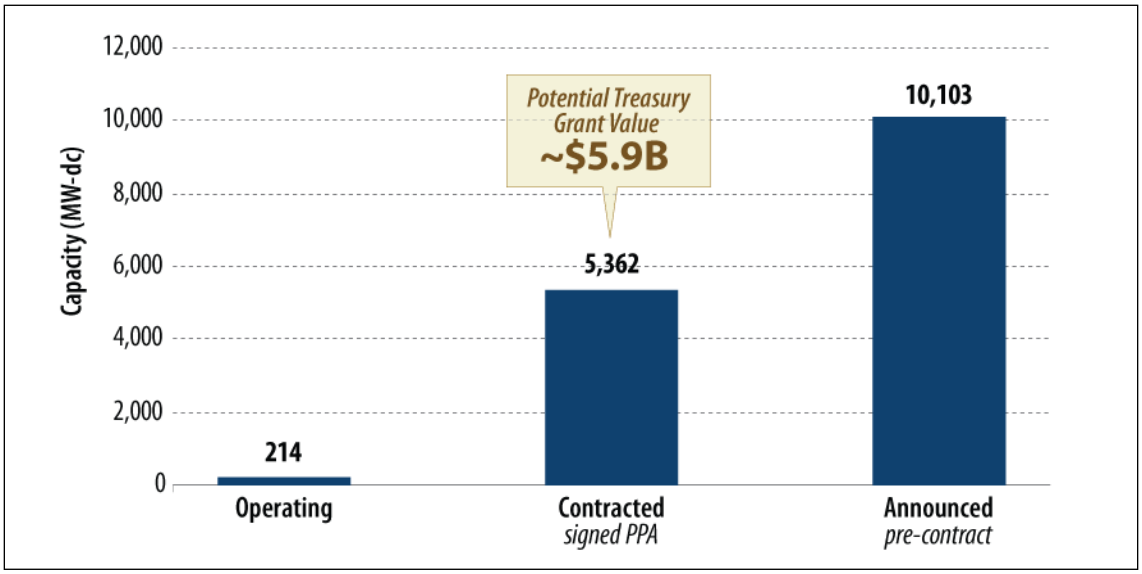
With the availability of the Section 1603 cash grant, solar electricity projects can choose (1) the conventional ITC option by either monetizing the ITC and accelerated deprecation or self-sheltering the tax benefits, or (2) projects can elect to receive a 30% Section 1603 cash grant while still benefitting from accelerated depreciation (MACRS depreciation deductions can be either self-absorbed or third party monetized). It is also important to point out that Section 1603 cash grants are typically received within 60 days of filing an application. While the "value" of the 30% ITC and the Section 1603 cash grant, in theory, should be equal, in practice the cash grant will likely be perceived as being more valuable than the ITC for the following reasons:

- **No transaction costs:** Realization of investment tax credits may require the project to monetize incentives at a discount to a tax equity investor and also demands personnel time and professional fees to complete the investment transaction. Section 1603 cash grants only require an application to be filed with the U.S. Department of the Treasury with payments typically received within 60 days.
- **No competition for tax equity:** A limited number of tax equity investors are available in the marketplace and projects that decide to monetize the ITC must compete with other projects for tax equity investment deals.
- **Time value of money:** Section 1603 cash grants are paid to projects within 60 days after application submission, while the ITC is claimed when tax returns are filed. For projects unable to fully claim tax credits in the first year, tax credits are carried forward to offset future tax liability. While the timing difference for the two options may not differ dramatically, the cash grant does provide a higher degree of certainty, with regards to cash flow, and flexibility to the project owner.
- **Taxable income risk:** Projects that elect the ITC have risk exposure associated with the adequacy of taxable income to absorb the full value of ITC incentives. A cash grant eliminates this risk.

An emerging segment of the U.S. solar photovoltaic (PV) market includes what is known as "Utility Scale" projects, which are typically multi-megawatt, centralized, grid-connected solar generation facilities. Approximately 214 MW-dc (Megawatts – direct current) of operating utility-scale PV projects exist in the U.S. today, while more than 5,362 MW of utility-scale solar projects are under contract (meaning they have a signed power purchase agreement, or PPA, with a third-party to purchase the electricity generated) and an additional 10,000 Megawatts have been announced (see **Figure 7**).[32]

[32] Shayle Kann, "The Future of the Utility Scale PV in the U.S," *Greentech Media*, December 1, 2010, at http://www.greentechmedia.com/articles/print/the-state-of-and-future-of-the-u.s.-utility-market/.

Figure 7. Projected Utility Scale PV Capacity Development Status



Source: Shayle Kann, "The Future of the Utility Scale PV in the U.S.", *Greentech Media*, December 1, 2010.

Notes: "Potential Treasury Grant Value" of $5.9 billion is calculated based on the following two assumptions: (1) Total capital cost = $4/watt; (2) Effective treasury grant for these projects = 27.5% (this is less than 30% since not all capital costs are eligible for the treasury grant).

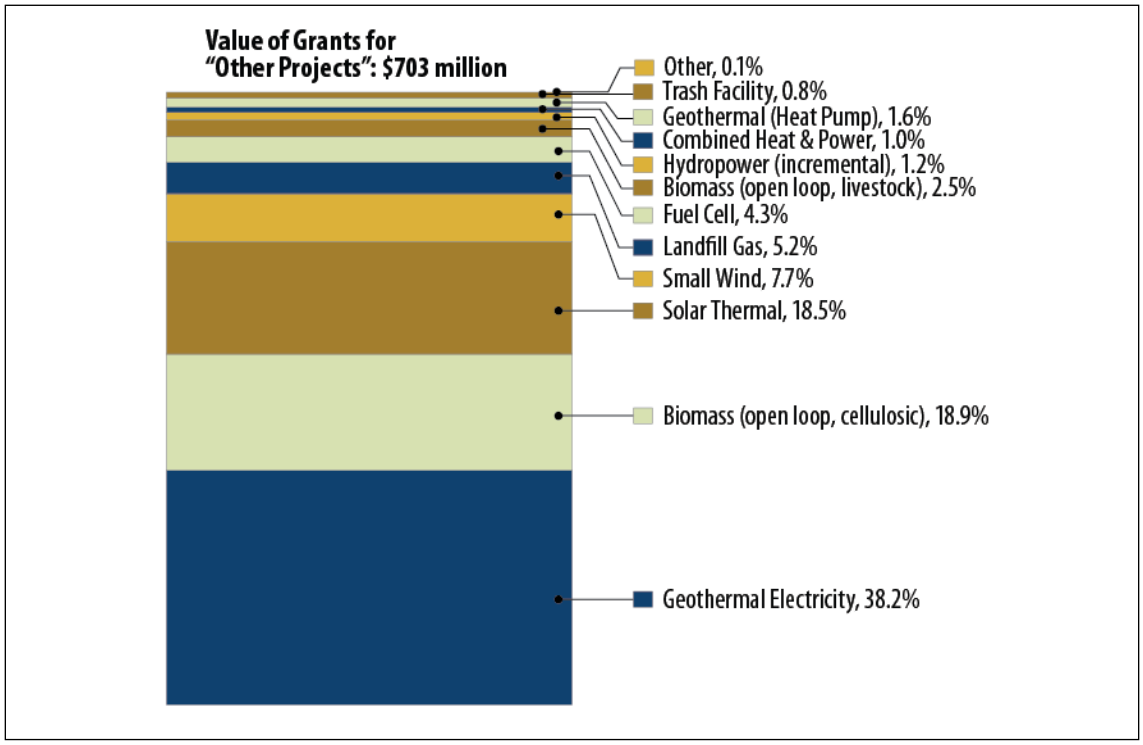
While it is unlikely that all contracted and announced projects will be constructed (some of these projects may encounter permitting, transmission access, financing, and other hurdles that could prevent their development), this analysis illustrates the maximum value of cash grants that might be awarded to utility-scale PV projects, assuming that all projects are eligible for, and elect, a Section 1603 cash grant. Additional solar technologies, including CSP (Concentrating Solar Power) and CPV (Concentrating Photovoltaic), may also pursue Section 1603 cash grants.

"Other" Technologies

A third category of Section 1603 cash grant awards is "other" technologies, which includes all eligible renewable technologies except wind and solar electricity. This category represents approximately 8% of total grant award dollars with an aggregate value of approximately $703 million. The figure below provides a breakdown of grant value received by the "other" technologies (see **Figure 8**).

The number of projects that have received awards in the "other technologies" category is relatively small compared to wind and solar electricity. Possible reasons for this may include (1) the financial community has a certain comfort level with wind and solar electricity project deals and may be wrestling with how best to structure project finance for "other" technologies; (2) securing attractive off-take agreements (i.e., Power Purchase Agreements) may be challenging for this set of technologies; (3) technology maturity and performance risks for some of the "other" technologies; (4) for some of the "other" technologies, longer development timelines introduce a degree of financial risk during the development phase of the project; and since tax equity, bridge loans, and project debt are typically committed during the latter stages of development/construction, some projects may not have the financial capability to fund longer development timelines.

Figure 8. "Other" Technologies: Section 1603 Grant Award Analysis



Source: U.S. Department of the Treasury.

The "other" technologies grant award category is dominated by four technology types: (1) Geothermal electricity; (2) Biomass (open loop, cellulosic); (3) Solar thermal; and (4) Small wind. Since the "other" technologies represent a relatively small portion of total grant awards, a rigorous assessment of each technology was not conducted in preparation of this report. However, the following discussion provides a condensed analysis of geothermal electricity, biomass, solar thermal, and small wind projects that have received Section 1603 cash grants.

Geothermal Electricity

Within the "other" technologies category, geothermal electricity projects have received 38% of grant award values representing approximately $261 million. Six geothermal projects have received Section 1603 cash grants to date, although five of these projects account for 99.9% of the $269 million of grant awards.[33] The five largest geothermal electricity projects were installed in three states: Nevada (3), Utah (1), and California (1). Installed nameplate capacity for each of these projects ranges from 18MW to 100MW.[34] Geothermal energy properties qualify for PTC, ITC, or cash grant incentives. Selection of the optimal incentive for geothermal energy property may be similar to the process described above for wind energy property.

[33] One project categorized as "geothermal electricity" received a $5,000 grant, while the other five projects received grant awards in the range of $28 million to $108 million.

[34] Geothermal Energy Association, http://www.geo-energy.org.

Biomass (Open-Loop, Cellulosic)[35]

To date, cellulosic biomass electricity generation projects have received approximately $133 million of Section 1603 cash grant awards. Fifteen cellulosic biomass electricity projects, in eleven different states, have received awards to date. Biomass may include "a large range of feedstocks … from woody and herbaceous biomass to agricultural residues."[36] Much like wind, biomass energy properties have the option of choosing PTC, ITC, or cash grant incentives. Therefore, selection of the best incentive for a particular project may be similar to the process described above for wind energy property.

Solar Thermal

Solar thermal projects typically capture heat from the sun to generate electricity, heat or cool structures, or heat water (except for swimming pools). As of October 24, 2011, more than 175 grants have been awarded to recipients for solar thermal projects. The total value of grants for thee projects is approximately $130 million. However, roughly 95% ($124 million) of this grant award value is represented by one large solar thermal electricity generation project in Florida.

Small Wind

Small wind facilities are distinguished from other wind projects based on the size of the turbine used to produce energy. Specifically, small wind projects include turbines with a nameplate capacity that does not exceed 100 kW.[37] Small wind Section 1603 cash grant awards include 81 projects with a total grant award value of $48 million. Most of the small wind project awards received range in value between $30,000 and $100,000.[38] Small wind incentive options, which include either an ITC or a cash grant, are similar to those available to solar electricity energy property. The above discussion about solar electricity may provide some insight into why small wind energy properties are motivated to elect the cash grant option.

Section 1603 and the Renewable Energy Tax Equity Market

The Section 1603 cash grant program was created as an alternative mechanism for renewable energy projects to realize federal tax incentives. Specifically, the program was created to address the limited availability of tax equity investor funds resulting from challenging U.S. economic conditions. U.S. Department of the Treasury guidance for the Section 1603 program states that "the Section 1603 program will temporarily fill the gap created by the diminished investor demand for tax credits."[39] In order to better understand the mechanics and function of tax equity investors, the following is a brief overview and analysis of the tax equity marketplace to include

[35] Treasury defines "open-loop biomass facilities" as follows: "An open-loop biomass facility uses open-loop biomass to produce electricity. Open-loop biomass is any agriculture livestock waste nutrients or any solid, nonhazardous, cellulosic waste material or any lignin material that is derived from qualified sources." See http://www.ustreas.gov/recovery/docs/guidance.pdf.

[36] CRS Report R41440, *Biomass Feedstocks for Biopower: Background and Selected Issues*, by Kelsi Bracmort.

[37] http://www.ustreas.gov/recovery/docs/guidance.pdf.

[38] One particular project listed as "small wind" received $43 million of the $48 million of the small wind awards. Further research indicates that this project includes 132 Megawatts of installed wind generation capacity and utilizes 3-Megawatt Vestas wind turbines.

[39] http://www.ustreas.gov/recovery/docs/guidance.pdf.

an assessment of available tax equity to support development of renewable energy projects. Analyzing the tax equity market is challenging since there is no official barometer or tracking mechanism available to assess the history and status of the tax equity marketplace. A survey of multiple industry sources, including statements from tax equity market participants and experts, was used to assess the history and current state of the U.S. renewable energy tax equity market.

What is "Tax Equity"?

Tax equity is a hybrid (debt/equity) type of investment that has a preferred position, over the project sponsor, for the project cash flows and tax benefits. For a renewable energy project, tax equity is a form of investment that allows the investor to use tax benefits such as losses created by accelerated depreciation and production/investment tax credits that would otherwise not be effectively used by the project itself (taxable income for renewable energy projects is typically not large enough to absorb these tax incentives). In essence, a renewable energy project can monetize (monetization is simply the conversion of future tax benefits into cash), at a discount, its federal tax incentives (PTC, ITC and accelerated depreciation) through an investor for cash that can be used to pay for a portion of project capital and installation costs. Much like traditional equity, "tax equity" takes risk on the project performing and operating as expected, but like debt "tax equity" has preferential financial treatment, with regards to cash flows, and typically requires a moderate rate of return (less than traditional equity; equal to or greater than debt rates).

Who are Renewable Energy Tax Equity Investors?

To date, most renewable energy tax equity investments have been made by banks, financial companies, investment banks, and insurance companies. These entities either have a taxable base large enough to realize the value of federal tax incentives for renewable energy projects or they aggregate a group of clients/third parties that can capture the incentive value. Specific firms with activity in the tax equity marketplace include JPMorgan, GE Capital, Wells Fargo, Morgan Stanley, and Credit Suisse, among others. These institutions are motivated to provide financing to renewable energy projects, since tax equity investments provide an opportunity to realize an attractive financial return on investment, partially by reducing total tax liabilities as well as through cash generated from the projects. Risks associated with these returns include subpar operational performance of the projects (especially wind, which is incented to maximize electricity production) and an inability of the investment entity to absorb tax incentives over several years (typically 5 to 10 years).

Renewable Energy Tax Equity Market Analysis

Since there are no official sources or statistics for tax equity, performing a comprehensive analysis of the renewable energy tax equity market, its size, and how it has changed, in light of recent economic conditions, is difficult. However, a disparate set of information and third-party analysis of the tax equity market was aggregated and compared to provide some insight and analysis into this relatively obscure project finance investment type. **Table 2** provides a summary of the renewable energy tax equity marketplace based on three different industry sources.

Table 2. Renewable Energy Tax Equity Market Analysis

	Chadbourne & Parke Reports				Bloomberg-NEF				USPREF			
	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010

	Chadbourne & Parke Reports				Bloomberg-NEF				USPREF			
# of Tax Equity Investors	14	9-18[a]	4	5-15[a]	16	n/a	5	n/a	20	13	11	16
Tax Equity Yields (%)	n/a	7.5-7.9	8.1-8.4	8-8.5	6.3	9	8->10	8.1	n/a	n/a	n/a	n/a
Total Amount of Tax Equity ($B)	5[b]	2.6[b]	1.1[b]	4.3[a]	n/a	n/a	n/a	n/a	6.1	3.4	1.3	3

Sources: Chadbourne & Parke Project Finance NewsWire reports from the following months: November 2008, January 2009, February 2010, April 2010, and November 2010. Bloomberg New Energy Finance, "Cash is king: shortcomings of US tax credits in subsidising renewables" January 20, 2010. Bloomberg New Energy Finance, "A bang or a whimper? Implications of the US Treasury cash grant expiration," August 2010. U.S. Partnership for Renewable Energy Finance, "Prospective 2010-2012 Tax Equity Market Observations," July 2010.

Notes:

Discrepancies associated with the "Total Amount of Tax Equity ($B)" numbers in the chart are partly due to some sources reporting these numbers as "raised and committed" versus "actually funded."

2010 Tax equity values ($B) include deals that provided "bridge" funding for the cash grant.

NEF = New Energy Finance

USPREF = U.S. Partnership for Renewable Energy Finance

a. Ranges in Chadbourne Parke reports are based on expert comments at different times of the year.

b. Tax equity numbers for years 2007-2010 is for Wind only; 2010 estimate is for the first three quarters of 2010; 2008 and 2009 numbers are not from the literature, but rather were provided as unofficial estimates from an industry source.

Table 2 provides an overview of the renewable energy tax-equity marketplace and changes observed since 2007. Some key takeaways from this tax equity market analysis include:

- Calendar year 2007 experienced the largest amount of renewable energy tax equity investment. An estimated $6.1 billion of "tax equity" went to various projects with approximately $5 billion dedicated to wind.
- In 2008, both the total volume of deals and the number of tax equity investors declined. Poor economic conditions are one possible explanation for this decline.
- Tax equity yields (the financial return to the tax equity investor) have fluctuated between 7.5% and 10% since 2007 and appear to have settled in the 8%-8.5% range. This fluctuation may be related to the volatility in the number of tax equity investors during the period (2007-2010).
- The number of tax equity investors and the amount of tax equity continued to decline in 2009. While some may argue that this is evidence of inadequate tax equity, others may argue that since Treasury guidance for the Section 1603 program was not released until August of 2009, the financial community was waiting until Treasury guidance was available before making any funding commitments.

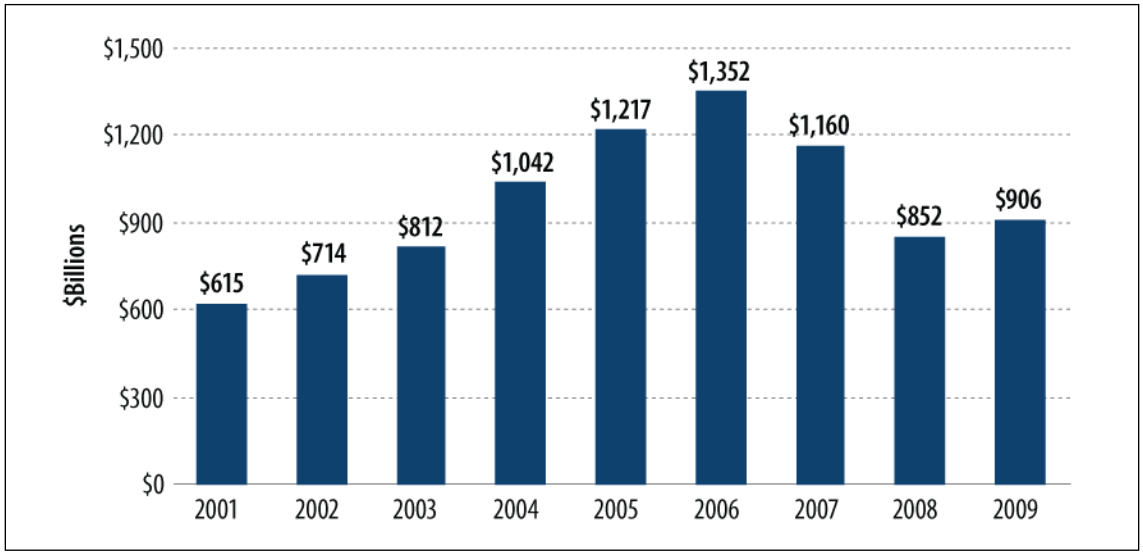
One additional observation in the above summary chart is that the tax equity market appears to be recovering from its 2009 lows. Data for 2010 renewable energy tax equity market activity

indicate that the number of investors is near record levels and transaction dollar volumes are increasing. On the other hand, comments from industry experts in the literature indicate that some tax equity investors currently (2010) in the market "could not have done a production tax credit or investment tax deal in 2007 and could not do one today."[40] In other words, according to this industry expert, the Section 1603 grant program has enabled participation by some tax equity investors that otherwise would not have made investments in renewable energy projects. According to industry expert commentary in the literature, Section 1603 cash grants allow tax equity investors to quickly recover a large portion of their investment, which in turn reduces the risk profile for tax equity investments.[41] This in turn reduces the required tax capacity for the investor and the investment recovery horizon is reduced from 10 years (typical under the traditional tax incentive structure) to 5 years or less (typical for cash grant tax equity deals).

In essence, availability of Section 1603 cash grants has changed the nature of tax equity investment deals and has also resulted in the emergence of new financial structures for renewable energy projects. Renewable energy investors now have multiple options to consider when financing projects.[42]

One alternative approach for evaluating the tax equity marketplace at a macro level is an assessment of all U.S. corporate profits. **Figure 9** shows corporate profits from 2001 to 2009. This figure represents total corporate profits (not profitability for firms that typically make renewable energy investments) and it provides a general sense of profitability trends in the United States since 2001. Since corporate profits are an indicator of taxable income, this macro-level information provides some degree of insight into tax credit capacity trends.

Figure 9. U.S. Corporate Profits: 2001-2009



Source: U.S. Department of Commerce - Bureau of Economic Analysis.

[40] Chadbourne & Parke, *Project Finance Newswire,* November 2010.

[41] Chadbourne & Parke, *Project Finance Newswire,* November 2010.

[42] Prior to the availability of Section 1603 cash grants, many wind projects were financed using a "partnership flip" structure and many solar projects were financed using a sale-leaseback structure. Section 1603 allows projects to use a variety of project finance structures to include sale-leaseback (for wind), direct loans, pre-paid PPA, etc. It is likely that financial structures will continue to evolve as the financial community becomes more familiar with cash grants and can structure targeted products for renewable energy projects.

Notes: Domestic Industries - Corporate profits with inventory valuation and capital consumption adjustments.

This data set illustrates that domestic U.S. corporate profitability has decreased from a recent peak in 2006. With regards to renewable energy tax equity investments, a specific analysis of the profitability of firms that typically make renewable energy tax equity investments may provide a more detailed estimate of tax equity capacity for these types of projects. Nevertheless, this macro view of corporate profitability does provide an indication of profitability, and therefore tax equity capacity, trends in the United States. One could argue that total domestic corporate profits represent a theoretical maximum limit for tax equity investments. However, a more realistic practical limit will likely be much lower since some companies may not have the capability, expertise, or comfort level needed to make investments in renewable energy projects.

Impacts of the 1603 Grant Program

The following sections provide additional analysis of the impacts of the Section 1603 grant program. The Section 1603 grant program has been popular with the renewable energy sector. Proponents of the program suggest that the added incentive is necessary to continue to promote renewable energy. The Section 1603 grant program, however, results in revenue losses that are greater than the revenue losses associated with the previously available tax incentives. Given the country's large budget deficits, there may be questions of whether further extensions of this program are worth the budgetary cost.

Economic Considerations of Section 1603 Implementation

From an economic perspective, energy tax provisions can be evaluated by asking two questions. First, does the provision address an energy market failure? Second, if the provision successfully addresses an energy market failure, is the provision the most economically efficient solution. The Section 1603 grants do address a perceived failure in energy markets, specifically use of fossil energy resources, which may have environmental and potentially energy security effects. As is often the case with energy tax incentives, however, the grants may not be the most economically efficient tool available for addressing this market failure.

A number of potential market failures may be used to rationalize government intervention in energy markets.[43] For example, in the electricity production market, externalities may lead to a market failure.[44] Electricity produced from fossil energy sources may have unpriced negative environmental consequences not taken into account when energy production and consumption choices are made.[45] If externalities are present, markets fail to establish energy prices equal to the social marginal cost of supply. The result is a system where cost and/or price signals are inaccurate, such that the socially optimal level of output, or allocative efficiency, is not achieved.

[43] For an overview of various energy market failures and economic rationales for intervention in energy markets, see CRS Report R40999, *Energy Tax Policy: Issues in the 111th Congress*, by Molly F. Sherlock and Donald J. Marples, "Using Tax Expenditures to Achieve Energy Policy Goals," *American Economic Review*, vol. 98, no. 2 (2008), pp. 90-94.

[44] An externality is a spillover from an economic transaction to a third party, one not directly involved in the transaction itself.

[45] Roth and Ambs (2004) use a levelized cost of energy approach that incorporates externalities to evaluate the full cost of generation across 14 generation technologies. They find that externality costs are higher for coal, oil, and gas than for renewables. See Ian F. Roth and Lawrence L. Ambs, "Incorporating Externalities into a Full Cost Approach to Electric Power Generation Life-Cycle Costing," *Energy*, vol. 29 (2004), pp. 2125-2144.

Economic theory suggests that a tax be imposed on activities associated with external costs, while activities associated with external benefits be subsidized—in order to equate the social and private marginal costs. These taxes and/or subsidies would, theoretically, result in a more efficient allocation of resources.

Oftentimes in energy markets, instead of taxing the activity generating the negative externality, policymakers have instead chosen to subsidize the non-polluting alternative. The Section 1603 grants are an example of such a subsidy. Section 1603 grants reduce the price of investment in renewable energy, encouraging development of additional renewable capacity. Subsidizing the alternative activity, rather than taxing the polluting activity directly, is an economically inefficient policy option.

Subsidies that encourage the use of alternative or renewable energy sources, as opposed to a direct tax on polluting energy sources, are economically inefficient for two reasons. First, subsidies reduce the average cost of energy. As the average cost of energy falls, the quantity demanded of energy increases, countering energy conservation initiatives. Second, paying for subsidies requires the government to raise funds elsewhere. If these funds are raised through a distortionary tax, such as a tax on labor, such subsidies are economically inefficient.[46] This concern is not unique to the Section 1603 grant program, as it also applies to the use of the PTC and ITC to promote investment in renewable energy.

Section 1603 grants may also be economically inefficient to the extent there are inframarginal beneficiaries. Inframarginal beneficiaries are projects that would have been installed without a grant, but receive a grant nonetheless.[47] The other type of recipients, marginal beneficiaries, are projects that were able to be installed only because the grant was available. The grant provides a windfall benefit to inframarginal beneficiaries, without resulting in additional installations of renewable energy generation capacity. The most cost-efficient tax incentives are those that have large marginal impacts. In other words, cost-efficient programs are those that lead to greater participation in the subsidized behavior, without simply rewarding those already engaged in the subsidized behavior. Again, this concern is not unique to the Section 1603 grant, as it applies to energy tax incentives broadly. The analysis presented in the "Wind" section above highlights how the additional incentive provided by the Section 1603 grant option might attract additional installations. As tax equity markets recover, increasing projects' ability to move forward without the grant, the number of inframarginal beneficiaries may increase, thereby decreasing the overall economic efficiency of the program.

Compared to tax incentives, the Section 1603 grants, or grants generally, may be a more efficient subsidy. From the perspective of the federal government, the efficiency of a subsidy can be evaluated based on funding flowing toward the subsidized activity relative to federal revenue losses.[48] Since many recipients of renewable energy tax incentives turn to tax-equity markets to monetize such credits at a discount, it may be more efficient for the government to provide grants directly rather than use the tax code as a vehicle for subsidization. Further, this would eliminate the need for tax-equity markets broadly, potentially leveling the playing field for smaller projects with less access to tax equity. Policymakers may be less inclined to use a direct grant approach, relative to a tax incentive or grant tied to a tax incentive option, as direct grants involve

[46] A tax on labor is distortionary as changes in behavior to avoid the tax result in reduced economic activity.

[47] In the energy literature, inframarginal beneficiaries are often referred to as free riders.

[48] Analysis by Bloomberg New Energy Finance finds that the government can achieve more on a per dollar basis when providing grants as opposed to tax credits. See Ethan Zindler, *Cash is King: Shortcomings of U.S. Tax Credits in Subsidizing Renewables*, Bloomberg New Energy Finance, U.S. Policy - Research Note, January 20, 2010.

government outlays and may be subject to greater budget scrutiny and the annual appropriations process.

Cost of Section 1603 to the Federal Government[49]

There are various ways to evaluate the cost of the Section 1603 grant program. It is important to remember that the Section 1603 grant program is sequentially related to the PTC and ITC. First, PTC eligible taxpayers may elect to receive an ITC instead of the PTC. Next, taxpayers can request a grant from the Treasury in lieu of the ITC. The option to claim the ITC in lieu of the PTC is expected to increase revenue losses associated with the ITC. As ITC-revenue losses increase, revenue losses associated with the PTC may decrease as fewer PTC claims are made in the out years.[50] Further, since the ITC is awarded at the time of investment, while the PTC is awarded for production over a 10-year period, shifting to the ITC will shift revenue losses forward as expenditures are made in the near term. Finally, as renewable energy taxpayers elect to receive a direct payment from the Treasury in lieu of tax credits, the Section 1603 grant program will result in federal outlays.

Table 3 presents the Joint Committee on Taxation's estimated revenue effects under ARRA. When the Section 1603 Grant program was established, the JCT estimated that the program would result in 10-year revenue losses of $218 million as taxpayers shifted from the PTC to the ITC, 10-year revenue losses of $158 million as grants were paid out, and $153 million in 10-year revenue gains due to reduced ITC and PTC claims in the future. As is noted below, subsequent JCT revenue scores suggest that the Section 1603 grant program is more expensive than was initially anticipated.

Table 3. Estimated Cost of 1603 Grants Under ARRA: JCT

millions of dollars

	2009	2010	2011	2012	2013	2009-2013	2009-2018
Elect ITC in lieu of PTC	-96	-131	-29	16	11	-230	-218
Grant in lieu of tax credit: outlay effects	-30	-88	-40			-158	-158
Grant in lieu of tax credit: revenue effects	3	11	22	41	41	118	153

Source: Joint Committee on Taxation, JCX-9-09.

The Department of Treasury's estimated outlays associated with Section 1603 are reported in the President's FY2011 and FY2012 Budgets (see **Table 4**).[51] The Treasury estimates that the Section 1603 grant program will result in outlays of $20.0 billion through 2016. As of September 20, 2011, $4.0 billion had been paid out in Section 1603 grants in the current year. Total payouts under the Section 1603 grant program, as of September 20, 2011, were $9.2 billion.

[49] For analysis of the cost of energy tax incentives broadly, see CRS Report R41227, *Energy Tax Policy: Historical Perspectives on and Current Status of Energy Tax Expenditures*, by Molly F. Sherlock, and CRS Report R40999, *Energy Tax Policy: Issues in the 111th Congress*, by Molly F. Sherlock and Donald J. Marples.

[50] Ultimately, a project's selection of tax incentive depends on the production capacity of projects. Given the option, one would expect projects to select the tax credit with the higher net present value (NPV). While some projects may not perform as expected, one would still expect the aggregate data to reveal the trend with respect to revenue losses noted above.

[51] See footnote 1 of Table 17-1.

Table 4. Outlays Under the 1603 Grant Program

millions of dollars

	2009	2010	2011	2012	2013	2014	2015	2016
Treasury's estimated outlays on grants in lieu of tax credits	1,050	4,201	4,260	3,350	2,850	2,140	1,520	620
Outlays on actual grant awards made	1,643	4,189	4,040[a]					

Source: Department of the Treasury, President's FY2011 and FY2012 Budgets and Section 1603 list of awards, available at http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx.

a. Total awards as of September 20, 2011.

Given the structure of the Treasury grant program, it is expected that the actual cost of the program will be less than the outlays under the program. Since the grant is designed to replace tax credits, the cost of the grant will be (at least partially) offset by reduced future tax expenditures. In other words, projects receiving a grant in lieu of the PTC receive funds from the government when the project is placed in service. However, since that project will not be claiming the PTC in the out years, paying the grant up front reduces PTC payouts in the future. Tax expenditure estimates prepared by both the JCT and Treasury, however, do not indicate decreased PTC revenue losses in the future. PTC revenue losses increase over time as the credit is adjusted for inflation and the amount of PTC-eligible production increases. That the PTC does not increase in the out years suggests that the dampening effect of the Section 1603 grant on PTC revenue losses do not exceed these other factors.

After having some experience with the Section 1603 grant program, the JCT revised the program's estimated tax expenditures.[52] The one-year extension of the Section 1603 Grant program enacted under P.L. 111-312 is associated with nearly $3 billion in federal revenue loss (see **Table 5**).[53] The cost of the extension alone exceeds the estimated annual revenue losses associated with the PTC and ITC. For FY2010, the tax expenditure estimate for the PTC was $1.4 billion with the ITC costing less than $50 million.[54]

Table 5. Federal Revenue Loss of One-Year Extension of Section 1603 Grant

millions of dollars

	2011	2012	2013	2014	2015	2011-2015
One-year extension of the Section 1603 grants in lieu of tax credits	1,941	1,045	—	—	—	2,987

[52] The JCT also scored an extension of the Section 1603 grant program as part of the Ways & Mean Committee's Domestic Manufacturing and Energy Jobs Act of 2010. In this preliminary score, a one-year extension was estimated to cost $4.8 billion over five years, with the cost falling to $2.7 billion over the 10-year budget window. The reduced cost over time reflects anticipated reductions in tax credit payouts over time as grants are paid up front (see Joint Committee on Taxation's score prepared for the Committee on Ways and Means, available at http://waysandmeans.house.gov/press/PRArticle.aspx?NewsID=11294)

[53] U.S. Congress, Joint Committee on Taxation, Estimated Budget Effects of the "Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010," as Scheduled for Consideration by the United States Senate, committee print, 111th Cong., December 10, 2010, JCX-54-10, available at http://www.jct.gov/publications.html?func=startdown&id=3715.

[54] Joint Committee on Taxation, JCS-3-10.

Source: Joint Committee on Taxation, JCX-54-10.

Notes: Total estimate for the 2011-2015 period may not equal the sum of all years due to rounding.

Job Creation from Section 1603

The potential for job creation has become a key factor in evaluating renewable energy investment incentives and programs. Despite being an issue of importance, quantifying and measuring green job creation and growth has been difficult. First, the term "green jobs" is not precisely defined. Second, authoritative data compiling jobs in the green economy do not exist.[55] Nonetheless, some estimates have been made regarding the jobs impact of the Section 1603 grant program.[56] While estimates have been made, this is not to say that such estimates have successfully overcome the challenges associated with estimating "green job" creation. Thus, it is recommended that any job creation estimate be viewed with skepticism.

Focusing on the wind sector, Bolinger et al. (2010) provide an early estimate of job creation under the Section 1603 grant program.[57] Counting only jobs resulting from projects that would not have been viable without the grant, Bolinger et al. estimate that the Section 1603 grant was responsible for generating 51,600 short-term jobs and 3,860 long-term jobs in the wind industry through March 1, 2010.[58] The American Wind Energy Association (AWEA) claimed that failing to extend the Section 1603 grant for one year, through 2011, would have put 15,000 wind energy jobs in jeopardy.[59] The Solar Energy Industries Association claims that the Section 1603 induced approximately 8,500 jobs in the solar industry through November 22, 2010.[60] Of these, an estimated 2,600 were installation or construction jobs, approximately 5,800 were in solar manufacturing, while approximately 60 jobs were related to operations and maintenance.[61]

To put these figures in perspective, it is helpful to compare estimates of job creation due to the Section 1603 grant provision to estimated job creation under ARRA broadly. The Congressional Budget Office (CBO) has released a series of reports analyzing the job creation and economic stimulus effects of ARRA.[62] The most recent report, covering the second quarter of 2011,

[55] For additional background, see CRS Report R40833, *Renewable Energy—A Pathway to Green Jobs?*, by Richard J. Campbell and Linda Levine.

[56] The Section 1603 grant application applicants file with the Treasury does request information on jobs and job creation from grant applications. Inconsistency in these self-reported job creation statistics has prevented the Treasury from releasing these data. Further, even if these data were released, it is unlikely that such job estimates would fully incorporate the grant's impact on job creation at the manufacturing level, and other potential feedback effects.

[57] Mark Bolinger, Ryan Wiser, and Naim Darghouth, "Preliminary Evaluation of the Section 1603 Treasury Grant Program for Renewable Power Projects in the United States," *Energy Policy*, vol. 38, no. 11 (November 2010), pp. 6804-6819.

[58] Bolinger et al. (2010) present data on job creation in terms of "job years." Short-term job estimates are the number of one-year full time equivalent positions created. Long-term jobs are assumed to last for the life of the project, generally 20 to 30 years.

[59] American Wind Energy Association, "Tens of Thousands of Layoffs in American Wind Energy Seen at Stake in Tax Extender Package," press release, December 7, 2010, http://www.awea.org/rn_release_12-07-10.cfm.

[60] Solar Energy Industries Association, *Job Creation from Extending the 1603 Treasury Program*, available at http://www.seia.org/galleries/FactSheets/Factsheet_TGP.pdf.

[61] Ibid.

[62] See Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output as of September 2009*, Washington, DC, November 2009; Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output From October 2009 Through December 2009*, Washington, DC, February 2010; Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output from January 2010 Through March 2010*, Washington , DC, May 2010; Congressional Budget Office, *Estimated Impact of the American*

estimates that ARRA stimulus funds increased the number of people employed by 1.0 to 2.9 million, lowering the unemployment rate by 0.5 to 1.6 percentage points.[63]

Potential Policy Options Related to Section 1603

When the Section 1603 grants were enacted under ARRA, the temporary grant program established a construction start deadline of December 31, 2010. The Tax Relief, Unemployment Reauthorization, and Job Creation Act of 2010 (P.L. 111-312) provided a one-year extension, allowing projects placed in service during 2011 as well as those under construction by the end of the year to qualify for the grant option. The grant option remains popular with renewables investors, and is likely to remain popular through 2011. Given the financial benefits associated with the grant option, the renewable energy sector is likely to request an extension beyond 2011.

In evaluating whether the grant should be further extended, Congress may want to consider a number of factors. First, if Congress decides that subsidizing investment in renewables remains a policy objective, policymakers might evaluate whether the grant is the most economically efficient mechanism for providing subsidization. Second, Congress may want to consider the policy rationale going forward. The grant was initially enacted to address weakness in the tax equity market. As the tax equity market recovers, should the grant program be retained? In practice, the grant program may have increased the use of renewable energy, addressing carbon mitigation and greenhouse-gas reduction policies. A question for Congress is whether these benefits, and the benefits associated with increased investments in renewable energy and potential job creation and economic stimulus, are worth the budgetary cost and overall contribution to federal deficits.

There are a number of options available to Congress regarding the Section 1603 grant program. The current construction start deadline of December 31, 2011, means that, without action, the grants effectively expire at the end of the year. Alternatively, Congress may choose to extend the grants. Extending the grant program could involve extending the construction start date, extending the placed-in-service deadline, or other modifications. Finally, there have been a number of benefits associated with the Section 1603 grants in lieu of tax credits that could be achieved through modifications to the existing PTC and ITC. These potential policy options are discussed in greater detail below.

Allow the Section 1603 Grant Program to Expire

Absent congressional action, projects beginning construction after December 31, 2011, will not be able to receive the Section 1603 grants in lieu of tax credits. These projects will, however, continue to be eligible for the renewable energy PTC or ITC (the expiration date of these incentives varies by technology). The Section 1603 grant in lieu of tax credit program was established to address limited tax-equity availability following the financial crisis. Since the goal of the program was to prevent a decline in installed renewable energy capacity for projects that

Recovery and Reinvestment Act on Employment and Economic Output From April 2010 Through June 2010, Washington, DC, August 2010; and Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output From April 2011 Through June 2011*, Washington, DC, August 2011. All available at http://www.cbo.gov/publications/collections/collections.cfm?collect=16.

[63] Congressional Budget Office, *Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output from April 2011 Through June 2011*, Washington, DC, August 2011, p. 2.

typically would have relied on tax equity, if tax-equity markets have recovered the grants may no longer serve their initial purpose.

While the status of tax-equity markets is one consideration, there are other factors that policymakers may want to consider. It has been noted that the Section 1603 grants in lieu of tax credits have provided a number of benefits to renewable energy projects. Benefits from the grant, such as full AMT exemption, relief from PTC "haircuts," and the exemption from passive credit limitations, in some cases may be worth more than the face value of the grant relative to the PTC (discussed in greater detail below).[64] Further, these benefits are available to all renewable energy projects, not just those who would have sought to establish a tax-equity relationship to monetize tax credits in the absence of the 1603 grant program. These benefits, among others, are discussed in greater detail below in the context of possible modifications to the PTC and ITC that would result in benefits similar to those afforded by the grant.

Extend the Section 1603 Grant Program

One option for Congress would be to again extend the Section 1603 grant program on a temporary basis. Temporary extensions are attractive for budgetary reasons, and allow for policy flexibility in the future. Temporary extensions, however, may not be attractive from the industry perspective as potential renewable energy project investors and developers face uncertainty with respect to future financing options.

Several issues arise in considering an extension of the Section 1603 grant program. One important issue is the placed-in-service deadline for wind to qualify for the PTC. Under current law, PTC-qualifying wind facilities must be placed in service by the end of 2012. For other PTC-eligible technologies, the placed-in-service deadline is the end of 2013 (see **Table 1**). Given the current status of the PTC, extending the Section 1603 grant option beyond 2012 would decouple the PTC placed-in-service deadline from that of the grant. If the PTC is no longer available for wind, any grant that continues to be available would no longer be "in lieu" of tax credits.

Historically, PTC expirations have been associated with subsequent declines in installed wind capacity.[65] The importance of long-term incentives for the renewable energy industry was recognized by Congress when enacting ARRA. Under ARRA, the PTC was extended for three years (previous extensions tended to be for one or two years). Thus, as the current Section 1603 grant deadline is only one year shy of the placed-in-service deadline for wind, Congress may wish to consider a more holistic reevaluation of existing tax incentives for renewables, rather than focusing specifically on the Section 1603 grant provision.

Modify Existing Tax Incentives to Enhance Benefits

Changes to the PTC and ITC

Certain features of the Section 1603 grant have provided a number of indirect benefits for renewable energy projects and investors. These indirect benefits are summarized in the shaded text-box below. The first option Congress may want to consider is modifying existing tax

[64] Mark Bolinger, Ryan Wiser, and Naim Darghouth, "Preliminary Evaluation of the Section 1603 Treasury Grant Program for Renewable Power Projects in the United States," *Energy Policy*, vol. 38, no. 11 (November 2010), pp. 6804-6819.

[65] U.S. Congress, Senate Committee on Finance, Ryan Wiser, *Wind Power and the Production Tax Credit: An Overview of Research Results*, Testimony Prepared for a Hearing on "Clean Energy: From the Margins to the Mainstream," 111th Cong., March 29, 2007.

incentives to allow for some of the indirect benefits that are afforded by the Section 1603 grant. While a full discussion of the potential effects associated with these policy changes is beyond the scope of this report, some key points are noted below.

Generally, there are more limitations on the PTC than there are on ITC-eligible investments or entities claiming the Section 1603 grant in lieu of tax credits. First, PTC projects cannot use the PTC to offset tax liability under the AMT after the first four years of production. Second, the value of the PTC may be reduced for projects receiving grants or other federally subsidized financing. Finally, PTC-eligible projects must be owner-operated, and must sell their electricity to an unrelated party. Relaxing these restrictions associated with the PTC would increase the value of the credit for some taxpayers while increasing the types of taxpayers and entities that would qualify for the PTC.

Indirect Benefits of the Section 1603 Grants[66]

AMT Relief

Taxpayers claiming the PTC are exempt from the alternative minimum tax (AMT) for the first four years (typically, taxpayers are eligible to receive the PTC for the first 10 years after a facility is placed in service). ITC eligible taxpayers are fully exempt from the PTC, as are those receiving the Section 1603 grant in lieu of tax credits.

Relief from "Haircuts"

Most taxpayers claiming the PTC must reduce the amount of the credit for any grants, tax-exempt bonds, other forms of subsidized energy financing, and other credits (certain open-loop biomass facilities are not subject to this restriction). The ITC and Section 1603 grant is reduced only for grants received when grants are not taxed as income. Under ARRA, the ITC does not need to be reduced for projects receiving subsidized financing. The Section 1603 grant is also not reduced for subsidized financing.

Relaxation of Owner-Operator and Power Sales Requirements

The PTC requires that energy must be produced by the taxpayer (the owner must also be the operator). Further, under the PTC, power must be sold to an unrelated party to qualify for the credit. This requirement discouraged the use of sale-leaseback or inverted lease structures by PTC-eligible projects. The 1603 grant in lieu of tax credit is available to developers engaged in sale-leaseback or inverted lease structures.[67] Additionally, tax-exempt entities may choose to lease renewable energy facilities from taxable owners able to receive the grant. ITC and Section 1603 grant projects are not subject to the power sales requirement, benefitting behind-the-meter projects.

No Limitation for Passive Investors

Passive investors, or investors not playing an active role in the business, can only use tax credits earned from passive investments to offset other passive income. Section 1603 cash grant recipients are not subject to passive credit limitations.

[66] These benefits are outlined in Mark Bolinger, *Revealing the Hidden Value that the Federal Investment Tax Credit and Treasury Cash Grant Provide to Community Wind Projects*, Lawrence Berkeley National Laboratory, LBNL-2909E, January 2010 and Mark Bolinger, Ryan Wiser, and Naim Darghouth, "Preliminary evaluation of the Section 1603 treasury grant program for renewable power projects in the United States," *Energy Policy*, vol. 38, no. 11 (November 2010), pp. 6804-6819.

[67] For further discussion, see Viva Hammer, "Alternative Energy Gets A Second Wind," *Tax Notes*, November 22, 2010, pp. 895-906.

Allow PTC-Property to Claim the ITC

A second option would be to allow PTC-eligible properties to continue to claim the ITC. If the grant program construction deadline of December 31, 2011, is not extended, certain facilities, primarily wind, open- and closed-loop biomass, and geothermal energy facilities, will no longer be eligible for the Section 1603 grant in lieu.[68] Wind facilities will still be able to claim the ITC through 2012, and other technologies may elect to claim the ITC through 2013. Allowing these types of projects to receive the ITC in lieu of the PTC beyond the current expiration would overcome some of the PTC limitations discussed above.

There are potential drawbacks, however, associated with allowing current PTC-eligible projects to continue to qualify for the ITC. Investment tax incentives for wind and certain other renewable energy facilities were introduced in the late 1970s.[69] The initial renewable ITC was allowed to expire in the 1980s, but was later replaced with a PTC in 1992. Congress elected to adopt a renewable energy PTC rather than an ITC for two reasons. First, by tying tax credits to production, rather than the cost of capital, the tax incentives were designed to reward the most efficient operations. Second, there were concerns that the ITC for wind of the early 1980s served as a tax shelter, with investors installing inoperable renewable energy equipment generating tax credits to offset income produced from other sources.[70] Allowing PTC eligible projects to be eligible for the ITC creates incentives for investment, rather than performance, and may raise issues similar to those addressed by Congress in the 1990s when choosing to adopt a PTC rather than an ITC.

Investors in renewable energy projects that are not involved in day-to-day operations are generally considered, for tax purposes, to be passive investors. Tax credits or losses of passive investors can only be used to offset other passive income. Renewable energy projects that generate losses in early years of operations may be less attractive to investors because of these passive credit and passive loss rules. The Section 1603 grant was not subject to passive income rules. Investors were able to receive the benefits from the grant immediately, while tax credits oftentimes are carried forward to a number of years until investors generate enough passive income to claim credits earned through passive investments in full.

Exempting renewable energy investors from passive loss rules may increase the attractiveness of renewable energy ventures to investors.[71] Doing so, however, may increase the likelihood that investors would use renewable energy investments as a means to reduce taxable income. Passive loss limitations were adopted in 1986 in an effort to reduce the use of tax shelters.

Alternatives to Enhance Access to Tax Equity

A third option could be to enhance access to tax-equity markets by adopting policies that would facilitate the trading or selling or tax credits.[72] Selling tax credits or trading credits for equity is

[68] Other PTC-eligible facilities unable to claim the ITC after December 31, 2010, are landfill gas, municipal solid waste, hydroelectric, and hydrokinetic facilities.

[69] For a history of energy tax policy, see CRS Report R41227, *Energy Tax Policy: Historical Perspectives on and Current Status of Energy Tax Expenditures*, by Molly F. Sherlock.

[70] For further discussion, see Viva Hammer, "Alternative Energy Gets A Second Wind," *Tax Notes*, November 22, 2010, pp. 895-906.

[71] Taxpayers with a working interest in oil and gas are exempt from passive loss rules, allowing credits and losses from such interests to be used to offset other income. The President's FY2011 Budget Proposal seeks to eliminate the passive loss exemption for oil and gas.

[72] An additional option that could be considered here could be an incentive similar to the New Markets Tax Credit

common practice for developers of Low Income Housing Tax Credit (LIHTC) eligible projects.[73] Developers eligible for the LIHTC have three options: (1) self-shelter (that is, claim the credits themselves); (2) sell the credit directly to an investor; or (3) sell the credit to a syndicator who combines credits across a number of projects. The ability to sell tax credits also allows tax-exempt entities to benefit from investing in tax-credit eligible projects.

There are a number of challenges, however, that would likely arise should Congress consider modifying energy tax credits to function like the LIHTC. First, for example, the size of the market for energy tax credits is smaller than that of the LIHTC. Over the 2010 to 2014 budget window, estimated tax expenditures for low-income housing credits are $28.5 billion. Tax expenditures on the renewable energy PTC and ITC are estimated to total $8.7 billion between 2010 and 2014.[74] Second, the LIHTC is a permanent feature of the tax code, while the PTC and ITC are currently temporary. Thus, given uncertainty surrounding PTC and ITC extensions, syndicators may choose to avoid energy tax credits.

Concluding Remarks

Given the approaching expiration of the PTC for wind, a proposed extension of the Section 1603 grant program may be evaluated jointly with a PTC modification. At the end of 2011, Congress may be asked to evaluate whether the benefits associated with the Section 1603 grant program outweigh the budgetary costs and take appropriate legislative action. This report highlighted the benefit to the renewable energy sector of the Section 1603 grant program, specifically the additional subsidy provided by the grant relative to previously available tax incentives. The added subsidy may lead to additional investments in renewable energy generation capacity, and help to enhance the national renewable energy portfolio. As also noted in this report, however, the added subsidy has added budgetary costs.

Additionally, this report assesses how the renewable energy market responded and performed since the Section 1603 grant program became law in February 2009. As noted in the analysis, motivations and incentives to use the grant program differ among the technologies that qualify for Section 1603 grants. In some cases, some renewable energy sub-sectors have actually experienced market size declines. This observation highlights the complexity of renewable energy markets and indicates that other factors, outside of the Section 1603 cash grant program, can influence market growth. If renewable energy expansion is a key policy objective, Congress may want to consider policies that holistically address these other factors in addition to the availability of tax-based incentives.

Furthermore, the Section 1603 grant program was motivated by difficult economic conditions that resulted in less tax equity investment capacity available for renewable energy projects to realize the value of ITC and PTC incentives. As the economy recovers, Congress might want to assess if Section 1603 is needed to serve its original purpose or if the cash grant options provides the renewable energy sector with additional benefits that stimulate continued market growth.

Finally, this report analyzed the Section 1603 grant program from an economic perspective. Section 1603 grants may be a more economically efficient mechanism than tax credits for

(NMTC). For additional background, see CRS Report RL34402, *New Markets Tax Credit: An Introduction*, by Donald J. Marples.

[73] For background on the LIHTC, see CRS Report RS22389, *An Introduction to the Design of the Low-Income Housing Tax Credit*, by Mark P. Keightley.

[74] U.S. Congress, Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2010-2014*, committee print, 111th Cong., 2nd sess., December 15, 2010, JCS-3-10.

delivering benefits to the renewable energy sector. However, subsidies to the renewable energy sector, whether grants or tax credits, are less economically efficient than pricing polluting energy alternatives. Like other tax incentives for renewable energy, there are inefficiencies associated with the Section 1603 grant program to the extent there are inframarginal beneficiaries. Again, a question before Congress is whether the benefits associated with the Section 1603 grant option are worth the budgetary and potential economic costs.

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